

SPEED TIME DISTANCE WORD PROBLEMS

2012A

16. **Answer (C):** Label the runners A , B , and C in increasing order of speed. After the start, runner B and runner C will be together again once runner C has run an extra 500 meters. Hence it takes $\frac{500}{5.0-4.8} = 2500$ seconds for runners B and C to be together again. Similarly, it takes $\frac{500}{4.8-4.4} = 1250$ seconds for runner A and runner B to be together again. Runners A and B will also be together at $2 \cdot 1250 = 2500$ seconds, at which time all three runners will be together.

2004A

17. **(C)** When they first meet, they have run a combined distance equal to half the length of the track. Between their first and second meetings, they run a combined distance equal to the full length of the track. Because Brenda runs at a constant speed and runs 100 meters before their first meeting, she runs $2(100) = 200$ meters between their first and second meetings. Therefore the length of the track is $200 + 150 = 350$ meters.

- 2008B 18. **Answer (B):** Let n be the number of bricks in the chimney. Then the number of bricks per hour Brenda and Brandon can lay working alone is $\frac{n}{9}$ and $\frac{n}{10}$, respectively. Working together they can lay $(\frac{n}{9} + \frac{n}{10} - 10)$ bricks in an hour, or

$$5 \left(\frac{n}{9} + \frac{n}{10} - 10 \right)$$

bricks in 5 hours to complete the chimney. Thus

$$5 \left(\frac{n}{9} + \frac{n}{10} - 10 \right) = n,$$

and the number of bricks in the chimney is $n = 900$.

OR

Suppose that Brenda can lay x bricks in an hour and Brandon can lay y bricks in an hour. Then the number of bricks in the chimney can be expressed as $9x$,

$10y$, or $5(x + y - 10)$. The equality of these expressions leads to the system of equations

$$4x - 5y = -50$$

$$-5x + 5y = -50.$$

It follows that $x = 100$, so the number of bricks in the chimney is $9x = 900$.

- 2009A 20. **Answer (D):** Let r be the rate that Lauren bikes, in kilometers per minute. Then $r + 3r = 1$, so $r = \frac{1}{4}$. In the first 5 minutes, the distance between Andrea and Lauren decreases by $5 \cdot 1 = 5$ kilometers, leaving Lauren to travel the remaining 15 kilometers between them. This requires

$$\frac{15}{\frac{1}{4}} = 60$$

minutes, so the total time since they started biking is $5 + 60 = 65$ minutes.